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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,062	12/11/2003	Hua Guo	128954-3	7820

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CANTOR COLBURN, LLP  
55 GRIFFIN ROAD SOUTH  
BLOOMFIELD, CT 06002

EXAMINER
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POULOS, SANDRA K

ART UNIT	PAPER NUMBER
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1714

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/733,062

Applicant(s)

GUO ET AL.

Examiner

Sandra K. Poulos

Art Unit

1714

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31, 33 and 34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-31, 33 and 34 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 8/07/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. All outstanding rejections and objections except for those described below are overcome by applicant's amendment filed 8/07/06.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The new grounds of rejection set forth below are necessitated by applicant's amendment filed 8/07/06. In particular, claims 1, 27-28, 30-31 have been amended to such that the nanofiller is limited to montmorillonite, nontronite, beidellite, volkonskoite, hectorite, saponite, magadiite, and kenyaite and must have no linear dimension greater than 100 nm, and wherein the nanofiller is intercalated with water soluble polymers, amphoteric surface active agents, choline compounds, or organosilane compounds, wherein these limitations were not previously present. Thus the following action is properly made **FINAL**.

### ***Information Disclosure Statement***

2. The reference EP 732371 A1 has been submitted twice; therefore examiner has not considered the duplicate citation.

The information disclosure statement filed 8/07/06 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. In

Art Unit: 1714

particular, EP 732371 A1 has been cited but a copy of EP 732371 A2 has been provided, which was a reference cited by examiner on PTO-892 mailed 5/09/06.

"Industrial Minerals and Their Uses" has also been cited by examiner previously.

***Claim Rejections - 35 USC § 103***

3. Claims 1-4, 6-25, 27-31, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager (WO 01/40354) in view of Ross (US 6,521,690) and the evidence given in Tsai (US 6,562,891).

WO '354 discloses a capped polyphenylene ether (PPE) resin combined with a curable unsaturated monomer (pg 7, lines 18-22). The PPE has the general formula of  $Q(J-K)_y$  (pg 8-11). Examples of fillers include silica powder, alumina, clays such as wollastonite, mica, and talc (pg 18 line 3 to pg 19 line 18; pg 20, lines 1-2). Curing catalysts that are peroxy based radical initiators are disclosed (pg 16 lines 7-20). The composition contains flame retardant compounds (pg 17, lines 4-21) and optionally stabilizers, lubricants, dyes, etc (pg 20, lines 10-13). The preferable capped PPEs include methacrylate capped PPEs (pg 11, lines 10-14). In the examples, MAA capped PPE is combined with monomers such as dibromostyrene, tetramethylolpropane tetraacrylate, hexanediol dimethacrylate, and diallylphthalate (examples; also see pgs 14-15).

WO '354 does not that the filler is limited to montmorillonite, nontronite, beidellite, volkonskoite, hectorite, saponite, magadiite, and kenyaite and must have no linear

Art Unit: 1714

dimension greater than 100 nm, and that the nanofiller is intercalated, nor discloses specific mixing steps in making the composition.

Ross discloses a nanocomposite containing a smectite clay intercalate that has been ion-exchanged with one or more quaternary ammonium compounds and further blended into a polymer resin to make the nanocomposite composition (abstract). The clay is a smectite clay such as montmorillonite, hectorite, saponite, and beidellite (col 5, lines 40-45) and is present from 0.1 to 40% (col 12, lines 4-7). It is generally known in the art that the clays used in nanocomposites have dimensions typically in the range of 1-100 nm (Tsai, col 1, lines 15-16). The intercalating agent is given in the formula in column 7. The anion is disclosed as a chloride, methyl sulfate, or others (col 7, lines 1-24). Both thermoplastics and thermosetting resins are suitable polymers for the nanocomposite (col 9 line 66 to col 10 line 35). The clay is dispersed in water and intercalated with the onium compound and blended with the polymer or with monomer (col 10, lines 36-67).

It would have been obvious to one of ordinary skill in the art to and to use 0.1 to 40% of the intercalated clay as the filler for the WO '354 composition because the clay of Ross gives improved dispersion over conventional organoclays, intercalates, or hybrid clays described in literature, and has been found to be highly dispersable in a variety of polymers, whether polar or non-polar (abstract). Also, it would have been obvious to use the method of Ross since nanocomposites made by such methods typically exhibit improved tensile modulus, strength, gas barrier and heat distortion temperature values (col 11, lines 14-19). Additionally, WO '354 discloses that the

Art Unit: 1714

curable composition may be dissolved in an effective amount of an inert organic solvent (pg 20 lines 14-15). In example 2 the methacrylate capped PPE is dissolved in solvent and vinyl monomer; the resin solution then has the filler added (pg 21). In example 3 the methacrylate capped PPE is dissolved in vinyl monomer (pg 23). However, WO '354 discloses that the order of blending and dissolution is not critical (pg 20 line 18).

Additionally, case law holds that the selection of any order of mixing ingredients is *prima facie* obvious. *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930). WO '354 suggests through the examples that the filler should be added to the PPE/monomer in a separate step, which is a common feature with the current methods.

4. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO '354 in view of Ross as applied to claims 1-4, 6-25, 27-31, 34 above, and further in view of Yeager et al in US 6,905,637.

The discussion with respect to WO '354 and Ross in paragraph 3 above is incorporated herein by reference.

WO '354 is silent with respect to the mixing energy of the composition.

Yeager discloses a functionalized poly(arylene ether) with alkenyl and acryloyl monomer and fillers such as silica, alumina, wollastonite (col 18, lines 3-37). Yeager discloses that it has been found that a desirable balance of mechanical and electrical properties may be obtained when the curable composition is mixed with a mixing energy of less than 50 kJ/L (col 24, lines 22-25).

Art Unit: 1714

Thus it would have been obvious to one of ordinary skill in the art to use a mixing energy of less than 50 kJ/L in the in the composition of WO '354 for the reasons in Yeager col 24, lines 22-25, cited above.

5. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO '354 in view of Ross as applied to claims 1-4, 6-25, 27-31, 34 above, and further in view of Merfeld (US 6,878,782).

The discussion with respect to WO '354 and Ross in paragraph 3 above is incorporated herein by reference.

WO '354 does not disclose a polymeric additive having a glass transistion temperature of less than or equal to 100 C.

Merfeld discloses a curable composition containing a functionalized polyarylene ether resin, an alkenyl aromatic monomer, and acryloyl monomer, and a polymeric additive having a glass transistion temperature of less than or equal to 100 C (abstract). It would have been obvious to one of ordinary skill in the art to include a polymeric additive having a glass transistion temperature of less than or equal to 100 C because thermosetting compositions have reduce shrinking on molding and improved surface characteristics with the combination (col 1, lines 46-60).

***Allowable Subject Matter***

Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. The seven obviousness double patenting rejections have been withdrawn in view of the amendment to the claims.

Applicant's arguments with respect to the claim have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



Art Unit: 1714

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sandra K. Poulos whose telephone number is (571) 272-6428. The examiner can normally be reached on M-F 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*SKP*  
Sandra Poulos

*Vasu Jagannathan*  
VASU JAGANNATHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700